



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/749,646	12/31/2003	Wenguang Li	066243-0243 (141218)	9408
33679	7590	06/12/2007	EXAMINER	
GE MEDICAL SYSTEM C/O FOLEY & LARDNER LLP 777 EAST WISCONSIN AVENUE MILWAUKEE, WI 53202-5306			ABRAHAM, SALIEU M	
			ART UNIT	PAPER NUMBER
			3709	
			MAIL DATE	DELIVERY MODE
			06/12/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

ED

Office Action Summary

Application No.

10/749,646

Applicant(s)

LI ET AL.

Examiner

Salieu M. Abraham

Art Unit

3709

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12/31/2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-27 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 15-19 is/are allowed.
- 6) ☒ Claim(s) 1-14 and 20-27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/31/2003 and 04/26/2004.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claims 6, 10, 19 and 25 are objected to because of the following informality: all claims include language "computed tomography, magnetic resonance, and/or ultrasound".

- ☐ "computed tomography, magnetic resonance, and/or ultrasound" should be changed to -- computed tomography, magnetic resonance, or ultrasound --.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pub. No.

US 2003/0093067 A1 to Panescu (Panescu) in view of US Pat. No. 5,997883 to Epstein (Epstein).

In Reference to Claim 1

Panescu teaches a method comprising "acquiring an image pertaining to an organ or structure inside a body (see abstract, figures 2 and 7A, and sections 0005 and 0039).

However, Panescu fails to also teach a method comprising "registering a representation of a probe which is inside the body with the image, the representation of the probe and the image being registered to substantially the same point in a bodily cycle."

Epstein teaches the acquisition of (MR) images based upon reference points in a bodily cycle such as the cardiac cycle in order to accurately correlate systolic with diastolic phase when reconstructing images at select points in the cardiac cycle (see abstract, figures 2 and 4-6, and column 4, lines 4-6). The invention allows the heart to be depicted at "phase of its cycle" and images reconstructed based on correlated cardiac cycle reference points (see column 4, lines 31-35). Therefore, the invention of Epstein uses individual points in the cardiac cycle as a common reference for correlating images and image similar to applicant's use of the same point in the bodily (cardiac) cycle to register the probe with the image of an organ or structure in the body (see column 3, lines 45-57).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have included the step of " the representation of the probe and the image being registered to substantially the same point in a bodily cycle " of Epstein

Art Unit: 3709

in the image acquisition method according to Panescu in order to more accurately link or correlate different events (images in this case) taken at different time points, but the same bodily cycle as explicitly taught by Epstein.

In Reference to Claim 2

Panescu in view of Epstein has been shown to teach all of the limitations of claim1.

Panescu further teaches the step "wherein the image was acquired prior to the probe being located inside the body" (see sections 0002 for functional element definition and 0008 for limitation).

Therefore, Panescu in view of Epstein further teaches all claim 2 limitations.

In Reference to Claim 3

Panescu in view of Epstein has been shown to teach all of the limitations of claim1.

Panescu further teaches the step "further comprising simultaneously displaying the registered representation of the probe and the registered image" (see section 0010 at top of page 2).

Therefore, Panescu in view of Epstein further teaches all claim 3 limitations.

In Reference to Claim 4

Panescu in view of Epstein has been shown to teach all of the limitations of claim1.

Additionally, Panescu in view of Epstein has been also been shown to teach the step

Art Unit: 3709

“wherein the organ or structure inside the body comprises a heart and the bodily cycle is a cardiac cycle” as discussed above in claim 1 (also see Panescu section 0007 and Epstein column 3, lines 45-57).

Therefore, Panescu in view of Epstein further teaches all claim 4 limitations.

In Reference to Claim 5

Panescu in view of Epstein has been shown to teach all of the limitations of claim 1.

Panescu further teaches the step “wherein the image is at least a three dimensional image” (see sections 0004-0007).

Therefore, Panescu in view of Epstein further teaches all claim 5 limitations.

In Reference to Claim 6

Panescu in view of Epstein has been shown to teach all of the limitations of claim 1.

Panescu further teaches the step "wherein the image is acquired using computed tomography, magnetic resonance, and/or ultrasound" (see figure 5 and section 0008).

Therefore, Panescu in view of Epstein further teaches all claim 2 limitations.

In Reference to Claim 7

Panescu in view of Epstein has been shown to teach all of the limitations of claim 1.

Panescu further teaches the step "further comprising spatially registering the representation of the probe with the image" (see section 0008 on page 1).

Therefore, Panescu in view of Epstein further teaches all claim 8 limitations.

4. Claims 8-14 and 20-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Pub. No. US 2003/0093067 A1 to Panescu (Panescu) in view of US Pat.No.6,216027 B1 to Willis (Willis).

In Reference to Claim 8

Panescu explicitly teaches the step of "acquiring an image pertaining to an organ or structure inside a body" (see section 0010 on pages 1 and 2). " However, Panescu fails to disclose the step of "simultaneously displaying the image and a representation of a probe; the image and the representation of the probe corresponding to substantially the same point in a bodily cycle."

Willis teaches about acquiring three dimensional ultrasound images with simultaneous display of medical devices (i.e. probes such as catheters) placed in the heart and tracking them through a custom ultrasound-based tracking system with improved tracking accuracy over those in the art at the time of his invention (see abstract and column 2, Lines 1-15 and 18-39). Because the image and representation of the probe are displayed simultaneously at the same time point, it follows that they are then acquired at the same bodily (cardiac) cycle.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have included the step of “simultaneously displaying the image and a representation of a probe; the image and the representation of the probe corresponding to substantially the same point in a bodily cycle” of Willis in the method of Panescu in order to “enhance the accuracy and usefulness” of tracking the movement or positioning of the probe within the heart as explicitly taught by Willis.

In Reference to Claim 9

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Panescu further teaches the step “further comprising spatially registering the representation of the probe with the image “ (see sections 0009 and 0010).

Therefore Panescu in view of Willis further teaches all claim 9 limitations as well.

Art Unit: 3709

In Reference to Claim 10

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Panescu further teaches the step "wherein the image is acquired using computed tomography, magnetic resonance, and/or ultrasound" (see section 0009).

Therefore Panescu in view of Willis further satisfies all claim 10 limitations as well.

In Reference to Claim 11

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Panescu in view of Willis has also been shown to teach the step "wherein the organ or structure inside the body comprises a heart and the bodily cycle is a cardiac cycle" as discussed above (see claim 8 motivation).

Therefore Panescu in view of Willis further teaches all claim 11 limitations as well.

Art Unit: 3709

In Reference to Claim 12

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Furthermore, Willis also teaches the step “wherein the probe is configured to sense the electrical properties of the organ or structure inside the body” (see figures 30A and 30B and Column 2, lines 25-31).

Therefore Panescu in view of Willis further teaches all claim 12 limitations as well.

In Reference to Claim 13

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Furthermore, Panescu also teaches the step “wherein the image was acquired prior to the probe being located inside the body” (see section 0008).

Therefore Panescu in view of Willis further teaches all claim 13 limitations as well.

In Reference to Claim 14

Panescu in view of Willis has been shown to teach all of the limitations of claim 8.

Furthermore, Panescu also teaches the step “wherein the acquiring step comprises storing the image on a computer readable medium” (see figure 1, reference mark 126 and sections 0039-0041).

Therefore Panescu in view of Willis further teaches all claim 14 limitations as well.

In Reference to Claim 20

Panescu teaches a system comprising:

- "memory configured to store an image of an organ or structure of a body (see figure 1, reference marks 104 and 126 and sections 0039-0041).

However, Panescu does not teach:

- a display configured to simultaneously display a representation of a probe, which is in, or adjacent to the organ or structure of the body and the image, the representation of the probe being registered with the image at substantially the same point in a bodily cycle.

Willis teaches :

- a display configured to simultaneously display a representation of a probe which is in or adjacent to the organ or structure of the body and the image (see column 2, lines 32-36); the representation of the probe being registered with the image at substantially the same point in a bodily cycle (see column 2, lines 36-44 and figures 30A and 30B).

Willis asserts that the system of his invention is improves tracking the placement of medical devices such as catheters in the heart for diagnostic and/or therapeutic purposes.

Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to have included the display with capabilities as described above of Willis in the system of Panescu in order to enhance the accuracy of tracking probe placement within an organ such as the heart as explicitly taught by Willis.

In Reference to Claim 21

Panescu in view of Willis has been shown to teach all of the limitations of claim 20.

Furthermore, Panescu also teaches the system “wherein the organ or structure of the body comprises a heart and the bodily cycle is a cardiac cycle” (see figure 1, and column 2, lines 26-36).

Therefore, Panescu in view of Willis further teaches all claim 21 limitations as well.

In Reference to Claim 22

Panescu in view of Willis has been shown to teach all of the limitations of claim 21.

Furthermore, Panescu also teaches the system “wherein the display is configured to simultaneously display a map of electrical properties of the heart in conjunction with the image and the representation of the probe (see figure 1, reference marks 104, 106, 142, 146 and 126, sections 0008 and 0050).

Therefore, Panescu in view of Willis further teaches all claim 22 limitations.

In Reference to Claim 23

Panescu in view of Willis has been shown to teach all of the limitations of claim 21.

Furthermore, Panescu also teaches the system “wherein the display is configured to simultaneously display electrical properties of the heart for at least one location of the probe in conjunction with the image and the representation of the probe” (see sections 0039, 0044 and 0050).

Therefore, Panescu in view of Willis further teaches all claim 23 limitations.

In Reference to Claim 24

Panescu in view of Willis has been shown to teach all of the limitations of claim 20.

Furthermore, Panescu also teaches the system “wherein the image is at least a three dimensional image” (see sections 007-0009).

Therefore, Panescu in view of Willis further teaches all claim 24 limitations.

In Reference to Claim 25

Panescu in view of Willis has been shown to teach all of the limitations of claim 20.

Furthermore, Panescu also teaches the system “wherein the image comprises one or more images acquired using computed tomography, magnetic resonance, and/or ultrasound” (see section 0008).

Therefore, Panescu in view of Willis further teaches all claim 25 limitations.

In Reference to Claim 26

Panescu in view of Willis has been shown to teach all of the limitations of claim 20.

Furthermore, Panescu also teaches the system “wherein the representation of the probe is spatially registered with the image” (see section 0007).

Therefore, Panescu in view of Willis further teaches all claim 26 limitations.

In Reference to Claim 27

Panescu in view of Willis has been shown to teach all of the limitations of claim 20.

Furthermore, Panescu also teaches the system "wherein the system is an electrophysiology monitoring system (see figures 7A-9B, sections 0007 and 0050).

Therefore, Panescu in view of Willis further teaches all claim 27 limitations.

Allowable Subject Matter

5. Claims 15-19 are allowed.

6. The following is a statement of reasons for the indication of allowable subject matter:

In Reference to Claims 15-19

In a method according to claim 15, the inclusion of "generating an image of an organ or by interpolating between and/or extrapolating from at least two other images of the organ or structure taken at other points of the bodily cycle, in combination with the other claim 15 steps was not found or fairly suggested by the prior art.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Xue et al., Chenal et al., Dupree et al., Willis et al., Osadchy et al., Panescu et al. and Nolte et al. have been included because they all encompass MR, CT or ultrasound imaging systems and methods that are strongly related to

electrophysiology studies and applications as described by the applicant. Additionally, Pearlman has been included because his invention involves imaging methodology and apparatus that reconstructs a single composite image or image set from two images or image sets at different time points. This is done in order to enhance or more accurately display any event(s) that transpired between the image acquisition time points.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Salieu M. Abraham whose telephone number is (571) 270-1990. The examiner can normally be reached on Monday through Thursday 8:30 am - 6:00 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Bomberg can be reached on (571) 272-4922. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Application/Control Number: 10/749,646
Art Unit: 3709

Page 15

SA

6/7/07

A handwritten signature in black ink, consisting of several overlapping horizontal and diagonal strokes, positioned above the printed name.

THAO X. LE
PRIMARY PATENT EXAMINER